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Buyer Perceived Service Quality in Industrial Networks

Abstract

The purpose of this article is to deepen our understanding of the concept buyer perceived service quality when establishing relationships in the industrial market. The focus is on a supplier building positions in separate business networks. The service offered is a patented laser application method, which prolongs the life-time and durability of metal components. For the supplier it is difficult to assess the right level of service quality and to know what the buyers appreciate. By carrying out in-depth interviews with the supplier and five buyers we have found and described three dimensions of buyer perceived service quality; the technical, the functional, and the economic service quality dimension.

A NEW SERVICE FIRM ON THE MARKET

A service firm building relationships to potential buyers in an industrial market faces several strategic problems. The two major questions are; (i) how to create relationships with potential buyers, and (ii) how to determine the quality level of the service offered. The first question focuses on the problem of building relationships; is it possible to break existing relations between potential buyers and their present suppliers, is it possible to become an additional supplier to potential buyers and in that way receive a part of the purchases, or it is possible to approach new buyers that have never bought the product before. The question concerning the level of quality is at least as important for success as how to choose a way of creating relationships. If the quality level is too high it might result in the firm not being able to cover the production costs. A low quality level, on the other hand, is likely to result in time and money consuming corrections of quality problems as well as dissatisfied lost buyers.

The difficulties in determining the right quality level are obvious both when establishing and maintaining relationships. The costs of finding the right quality level are, however, high. Accordingly and especially for small firms, it is critical to find the right quality level, since necessary large investments in buyer relationships, technical equipment, etc., do not allow a trial and error-strategy for a longer period of time. The supplier can not only concentrate on correcting the mistakes upon delivery, there has to be quality thinking in the firm as a whole and at all levels.

Earlier studies of perceived service quality in the industrial market are few. The studies that have dealt with service quality have usually been made in the consumer market, or they have dealt with quality aspects in the production process. The importance of service quality, however, can not be denied though, since many studies clearly indicate its importance [3, 4, 9, 21, 22].

Service Quality

The purposes of this study are to find different aspects of perceived service quality in an industrial context and to determine how buyer perceived service quality influences a supplier's possibilities to build relationships. The supplier in our study is a service firm, whose primary service is laser treatment of metal components in the purpose of improving their durability and extending their life time. The supplier creates, together with the buyers, suitable laser applications and possesses a highly flexible laser equipment. The supplier, in other words, markets a service, an intangible product, which mainly can be characterized as a process or a series of processes, where among others R&D, testing and production are included. There are some elements in the laser treatment, which are the same regardless of the buyer, but it is in many ways adapted to the individual buyer's needs and wants. The buyers are themselves actively involved in developing the product since they provide the supplier with specifications, and components.

The measuring of quality usually involves everything from suitability for use to zero mistakes in the production. In our study we have chosen to approach service quality from a holistic perspective, and mainly from the buyer's point of view. Service quality is consequently defined as the buyers' perceptions of the service offered by the seller. Since several buyers have been interviewed some of the answers will complement each other, and some will even reflect opposite views. This is, however, natural as the perception of service quality is person and situation specific and consequently, at least partly, is can vary from buyer to buyer and from situation to situation.

Until now, research concerning service quality has foremost been carried out in the consumer market and it has been assumed either explicitly or implicitly that the service quality dimensions

found there can be applied to the industrial market as well. In the consumer market quality is usually divided into a technical ("what") and a functional ("how") dimension [9]. These dimensions can further be divided into determinants like reliability, responsiveness, competence, access, courtesy, communication, credibility, security, understanding and tangibility. Our view is, however, that it is not correct to accept this assumption without a closer evaluation, because there are many major differences within a certain type of market and especially between different types of markets.

The quality concept particularly when establishing relationships is a further cause for this study since service quality is considered to be one of the most vital factors when choosing a supplier. Especially firms establishing positions in networks, where advanced and adapted technology alongside with high transfer capability [10] are of importance, are forced to invest considerable resources to find the right level of quality, since it is clearly not the technical aspects of the offer alone that determine the success. A smaller firm with limited resources is even more dependent on finding and developing the right quality level in a reasonable time. These factors motivate a study where the aim is to find different aspects of buyer perceived service quality in a highly developed and adapted technology context.

The theoretical framework is derived from the network approach and the service quality concept. Empirical data has been gathered through in-depth interviews, both in the focal firm, the supplier, and in five buying companies for whom the supplier has developed laser applications. The interviews were carried out between the autumn 1991 and the spring 1993 with the persons, who personally were responsible for developing the contacts with the laser application supplier. The interviewed persons had positions as technical manager, vice presidents, mechanical engineer, production engineer, and maintenance manager. The buyers were both medium-sized and large companies in a varied line of business; pulp, forest, defense, power plant, and are situated in the same country as the supplier, namely Sweden.

ESTABLISHING RELATIONSHIPS

When a firm builds a position in a network it establishes relationships to other firms who already are embedded in the network. A business network contains; **actors**, i.e., individuals, firms, departments, organizations or coalitions of organizations, **activities** emerging when the actors combine, create, develop and transfer resources, **interactions** between the actors which create exchanges and adaptations, **relationships** aiming at long-term commitments and bonds, and finally both direct and indirect **resources** [13, 15].

Hammarkvist, Hakansson & Mattsson [10] state that it is important to choose which network to penetrate. This is the case when the firm chooses to establish relationships in one network where its potential exchange partners are. However, when for example a newly founded firm, begins to build relationships to other firms two situations can arise; the firm can either penetrate one existing network where the potential firms are, or build relationships to firms in separate networks. In the latter case the established firm connects the previously unconnected networks with each other. Figure 1 illustrates these two situations.

(INSERT FIGURE 1 HERE)

Situation 1. A firm that recently has started a business probably has a relatively limited network, consisting mainly of relationships to some suppliers and some other firms with an interest in the firm. These firms connected to the new firm can be financiers and suppliers of raw materials, machinery, etc.. If the firm builds relationships to firms in a network, he will eventually become a part of this network. The network to which the buyers belong will in other words expand and include the new supplier and his original network.

Situation 2. The firm is also in this case newly founded and has a similar network to the previous situation described. The firm is about to create new relationships to buyers in separate networks in different lines of business. These networks can be separate because of differences in the products produced or used production technology. The firm will act as a binding link between the different networks. The networks will be indirectly connected through the firm, which serves the previously separate networks. This kind of situation occurs when a firm has developed a problem solution, a product that can be used in many different areas. This creates a more complex situation for the newly founded firm and demands more resources, greater flexibility of the product, more varied social contacts and more information since the business areas are many and probably differ from each other.

Quality in an Industrial Network

Quality has traditionally been measured from either the seller's or the buyer's perspective and very little attention has been paid to dyadic relationships or networks. In a dyadic relationship both the seller's and the buyer's perception of the perceived quality is evaluated, without including the impact of other buyers and their influence. Using a network perspective implies that both direct and indirect influences and relationships are included. It is in other words, a more holistic approach since we analyze not only direct influences on quality by one or two firm's but include also influences from other firms in the network indirectly influencing these firms and their relationship. If, for example, one of the seller's buyers requires ISO certified products, the other buyers of the seller will simultaneously benefit from this requirement.

A network perspective is thus not limited to relationships between one seller and one of its buyers. In most cases the buyers use the purchased product in their production processes to

produce products to sell to their buyers, resulting in quality requirements by the buyers' buyers to consequently affect the buyer demands from the seller. In turn the buyers' buyers are selling their products to their buyers extending the quality chain even further. A firm penetrating a network must bear the impact of the actors' embeddedness in mind and consequently a service strategy built on quality must be derived from an evaluation of the needs and wants of not only the buyers to whom it has direct relationships, but also the buyers' buyers, suppliers suppliers, etc., to whom the firm has indirect relationships. The research and planning undertaken before entering a network must therefore include actors in different positions, otherwise the possibilities to offer the right quality is limited and the firm will not achieve the desired position in the network. In the same way, a firm unable to respond to the demands and requirements of the firms in the network will face a weakened position in the network.

The Supplier and the Offered Service

The focal actor in our study is a service firm establishing relationships to potential buyers in separate business networks, for example, pulp, forest, auto, defense, engineering, and power plant industries. The firm has developed a patented technological innovation within laser technology, which can be used in many fields. The flexibility of this kind of laser treatment of metal components is illustrated by the president who said: "We have had some kind of cooperation with 21 of the 100 biggest companies in Sweden".

The novelty with this method is that the powder used to improve the wearing surface is not applied directly on to the metal component, instead it is applied by means of the laser beam on the metal component. Parts of engines in production processes that are exposed to wear and tear can either be prepared on beforehand or after being in use for a while. The advantages for the buyer are more durable production machinery as well as fewer break-downs. These advantages are highly desirable as they help save a lot of money and minimize delays.

The studied supplier is the only firm on the market selling this kind of laser application method. Other firms have tried to develop materials and applications, which would make it possible to prolong the life-time of surfaces exposed to intensive wear. Some have even tried to develop a similar method, but these experiments all seem to have failed. Therefore there are no competitors with exactly the same laser application method. The buyers can of course choose to use the products until they replace them with new ones. The immediate competitors are a few large companies in Switzerland, the U.S.A and Japan who have specialized in limited applications. In addition to these there are some companies producing substitute surface treatment methods. Other available methods, however, can not guarantee the same durability and reliability. Their areas of applicability are neither as many as that of the laser application method.

The entrepreneur, who also is the president, owns 63 % of the firm and financiers own 37 %. The organization is divided into production, R&D and other services. The firm is on one hand technically oriented since the carrying out of the buyers' technical specifications is very essential, on the other hand the entrepreneur claims to offer services highly adapted to the buyers' needs.

The Supplier's Quality Objectives

Zero mistakes as well as the highest possible technical quality were earlier the supplier's goal in whatever was undertaken, now the aim is to offer *the right quality* - from the buyers' point of view. The earlier quality aspiration level was found to be too expensive and the buyers, especially new ones, found the price too high. Achieving a quality level that can be regarded too high is not by any one involved regarded necessary, and it certainly does not justify the attached costs. A trade off between costs and the quality level is a guideline when determining what

quality level to offer. Simultaneously it constitutes the main problem the supplier faces and has to deal with daily.

The firm's functions are mainly considered to be production, money, personnel and professionalism. In addition they also consider competence, creativity, quality and commercialism as key functions. Their opinion is that the main shortages in the firm for the moment lie in the fields of professionalism, commercialism and money. A possible reason could be that the firm still is too technically oriented, and is trying to reach a too high a quality level which in turns leads to very high costs. Another reason could be that the firm is relatively new, which also applies to the personnel, and that the employees do not yet have enough knowledge about the potential buyers. This fact was underlined by one of the buyers, who found the supplier very skillful in solving technical problems, but clearly lacking in commercial skills when marketing the laser treatments.

The Supplier's Buyers

It is crucial for the firm to know and to learn the buyers' different needs, which can vary a lot since many lines of business are involved. The aim of the supplier has been to build a network of relationships consisting of only positive relationships connecting previously separate networks. Cook and Emerson [5] and Yamagashi, Gillmore and Cook [23] claim that power in social exchange networks can consist of three different relationships; positive, negative, or mixed. Positive relationships imply that one relation does not exclude another, or both can exist side by side, for instance that two firms can use the same supplier.

This can occasionally lead to the supplier being forced to renounce potential buyers because they compete with present ones. In other words the supplier deals with and develops relationships

with mainly one buyer per line of business. All of the studied buyers correspondingly report that they would break the relation if the supplier should establish relationships with their competitors. The flexible laser application method that can be used in treating fundamentally all kinds of metal surfaces creates a large potential in spite of this substantial limitation.

The Supplier's Relation to the Buyers

The supplier states that "it is six times more difficult and more expensive for a new supplier to find buyers than it is for an established supplier. An unknown production technology makes it even more complicated." A problem the supplier clearly faces is how to show potential buyers what it stands for, and how to motivate the costs necessary for bringing forth a suitable laser application. Developing a suitable application takes place in cooperation with the buyer. The buyer provides the supplier with detailed specifications and the supplier develops and tests different applications in his laboratory. After having developed a possible suitable laser application full scale tests are carried out. Sometimes these tests take place in the production facilities of the buyer, occasionally even the end user is involved. Provided the technical quality is good enough production on a regular basis starts. The whole process is very costly and it can, of course, be stopped whenever the parties want to. The terms of the agreement are usually, but not always, stipulated in written contracts. The buyers supply the metal components and the service of the supplier consists of treating the metal surfaces in laboratories as agreed upon. Together with the buyer a goal is set to develop a suitable laser application method and to give the buyer what he needs and in the end increase the value of the buyers' products.

The supplier also explicitly states that he is willing to enter different forms of cooperation with the buyers, for instance joint ventures, licenses, system selling or technical cooperation. Only 3 - 5 development projects take place simultaneously since the supplier wants to be able to

concentrate on each individual buyer and to learn about the buyers' needs in detail. The potential and actual buyers are divided in segments, groups according to application area, and degree of engagement. The personal contacts to the buyers are made systematically and according to the supplier good personal contacts are utmost crucial for anyone wanting to get and to stay in touch with buyers in order to create and develop relationships. The entrepreneur has estimated that about 50 % of his time is spent establishing and maintaining contacts with potential and present buyers.

Establishing New Relationships

Establishing relationships is clearly not an easy task. In the interest of the buyer is often to minimize the number of suppliers in order to decrease the exchange costs [2]. Long-term relationships create a pressure for development [10] which in turn results in investments in bonds and commitment. The evolving bonds make it more difficult and expensive to break the relation. Hedaa [11] describes four different situations that could arise when a buyer chooses new suppliers.

Firstly, when a buyer is new on the market or he has just started to use the particular product it is natural that new relationships to suppliers are built, i.e., the supplier is given a possibility to reach completely new buyers. New technology can be a further reason for buyers asking for suppliers. Axelsson and Laage-Hellman [2] estimate that 20 to 25 % of the engineering industry's technical development occur within existing relations in Sweden.

Secondly, the buyer wants to change supplier because he, for some reason, is not satisfied with his present supplier and therefore is looking for a new one. The reason can often be found in dissatisfaction with the quality offered, deliveries, adaptations, technology, or price. Dubois [6]

shows in a study carried out in a Swedish manufacturing firm covering the time period 1964 to 1992 that 43 changes have occurred in the relationships to the suppliers of 11 specific components. 25 of the changes have been price related, in some cases the variation in price was up to 50 %. It is also noteworthy that in 11 of the 25 cases the suppliers were able to come back at a later date. 6 of the changes had been made owing to the suppliers' weak ability to deliver, and only 3 changes were caused by the supplier failing to meet the buyer's need for technical innovations.

Thirdly, we have one group of buyers that consists of those who buy a product but for one reason or another is looking for an additional supplier. One reason might be that the buyer wants to decrease the dependence arising from having only one supplier. By having more than one supplier the buyer can spread the orders and acquire more general product, price, and market information. Another reason may be that the buyer wants to get a lower price or more competitive payment terms and by adding a new supplier he can keep the suppliers aware of the possibility that they can be replaced if they fail in some way, or try unreasonably to increase the price. This type of thinking is in congruence with the classical buying philosophy [2]. Using alternative suppliers helps the buying firm to obtain information about prices and innovations and thereby to have better information when making decisions.

Finally, we have the possibility for a supplier to go in and break relationships between a potential buyer and his present supplier. Hedaa [11] says that in a discussion with the sales division of a firm in Finland it came to light that only about 10 % of their new relationships came from breaking existing relationships. In order to manage to break existing relationships, the supplier has to have something unique, like a new technology, a new product concept or lower prices to offer the potential buyer.

The studied buyers' cooperation with the supplier

All the buyers in our study mentioned that they were not fully satisfied with their present suppliers, but there were no alternatives until the new laser treatment method was made known. They all faced considerable costs caused by wrong deliveries and corrections. These costs, extra expenses, are not easily estimated since they do not only consist of expenses for corrections and discarded materials but also of indirect and alternative costs like lost working time, repetitive work, inspections and so on. Therefore all of the studied buyers had more or less actively been searching for a method that would result in fewer quality problems and decreased quality costs.

In spite of great uncertainty in the beginning of the cooperation and high initial costs the buyers chose to initiate cooperation with the new and relatively unknown supplier, since there were many and considerable potential advantages both of technical and economic character with this kind of laser application. It was not the end users who demanded an improvement, quite the contrary, the buyers were prepared themselves to pay the extra costs. The buyers' motives for choosing the supplier of laser application were two fold; the ability to offer more competitive and durable products to their buyers, and the possibility to reduce their own quality costs.

Quality certificates

The awareness of quality that exists in industrial firms is obvious and more and more companies apply for and are granted quality certificates like ISO. The certificates are used as a competitive mean and assure that quality thinking permeates the whole firm, including used suppliers. A firm aiming at quality and ISO certificates has to use suppliers that have been granted an ISO certificate. This can be an additional driving force for a firm to start looking for suppliers. The

competitive advantage that an ISO certificate gives today will probably be eliminated in the future as more or less all firms acquire quality standards.

All of the studied buyers have applied for ISO certificates and were collecting the needed documentation. Consequently the buyers considered themselves having good quality standards and emphasising quality in general. It was not a problem that the supplier in this case did not have an ISO certificate since the supplier was familiar with ISO standards and requirements. ISO certificates include only technical issues of the product; buyer perceived quality and other unnoticed and hard to measure aspects are left out from the documentation and certification. Buyer perceived quality is much more than technical aspects of the product and therefore not the same as a certificate. Buyer perceived service quality is according to the studied buyers regarded an overall impression of the supplier; services, laser applications, adaptations, efficiency, and personal contacts.

BUYER PERCEIVED SERVICE QUALITY

When measuring buyer perceived service quality in the industrial market, it is in our view essential to include the context in which the firms. Made market investments, e.g., investments of time and money in bonds, commitments as well as a long-term perspective have to be taken into consideration when service quality is examined. Market investments which have led to bonds make the firms more or less unwilling to break the relationship as well provide a stable secure ground for product development, change, and information diffusion. In service quality models created for the consumer market [7], exit is always an alternative for dissatisfied consumers, since the number of firms offering the same kind of products, is usually quite high and it is easy to switch between products and firms. Naturally this opportunity also exists to some extent in the industrial market, but the loss of made investments tends to be significantly

higher, since the heterogeneity of the resources makes the cost of changing supplier high. Furthermore, it can be difficult to find a new supplier.

Buyer Perceived Service Quality

In figure 2 the relationship between two actors, a supplier and a buyer, in the industrial market is built on interactions and investments in bonds. Usually, the relationship starts with an interaction, before which the firms stipulate their goals, e.g., what they want to achieve based on perceived needs. The goal of the firm is to gain access to resources controlled by the other firm, e.g., technical competence, money, and raw materials. The actors are said to be attracted to each others' strategic identities. An actor's strategic identity consists of the direct and the indirect resources he controls and the buyers' business strategy [1] respectively the sellers' purchasing strategy [10]. The resources can be divided into personal assets, software assets, hardware assets, organizational assets and capital assets. Direct resources means that the actor has direct control, i.e., hierarchic power, over the resources, e.g., patents, machines, facilities. Indirect resources can be gained through interactions with other actors in long-term relationships, e.g., raw material, personnel, money [14].

(INSERT FIGURE 2 HERE)

The interactions consist of three types of exchanges; (i) business exchange, (ii) social exchange, and (iii) information exchange. One or more of these exchanges take place every time the firms interact with each other, and every interaction leads to investments in different kinds of bonds. Bonds are developed as a consequence of commitments and the use of resources in a specific purpose in order to achieve stability, closeness, security and long-term relationships with other firms in the network. *Technical bonds* are based on technical adaptations of the product,

materials, equipment to the buyer and can be very hard to break for a new supplier. *Planning bonds* arise when the firms adjust their logistic functions to each other and for example implement Just-in-Time deliveries and on-line-contact, whereby costs for stock keeping substantially are reduced. *Knowledge bonds* are gradually developed as the firms learn about each other's strengths, weaknesses, needs, problems, and possibilities. *Social bonds* take time to develop and are based on individual representatives getting to know and trust each other and can be a complement to written contracts. *Economic and legal bonds* are made up of contracts, legal ownership, different forms of cooperation, payment terms, etc.

In the relation between the actors there are also other inter-organizational flows like power, dependence and conflicts. Particularly in situations where the firms are specialized and very unequal in size, there is a high risk for one of the firms of becoming highly dependent. Furthermore, different norms are developed, which restrict and guide the actors in the interactions. Within the relationship trust, which is a form of mutual confidence or reliance, will usually gradually evolve. Trust can be regarded as a prerequisite for all kinds of relationships since the lack of trust often makes it impossible to continue to make exchanges.

The dynamic relationship constitutes of interactions leading to market investments, which lead to new interactions, which lead to further market investments and so on. This proposal is true, however, only as long as the interacting firms are satisfied with the outcomes of the exchanges. A conformity between the goals and the outcomes are in other words needed. Service quality on the consumer market has been measured in a similar way. Gronroos [9] states that consumer perceived service quality can be found in the perceived difference between service expectations and experienced service. In the case that the perceived service matches or exceeds the expectations the buyer will be satisfied with the service. If the service, on the other hand, does not meet with the expectations the buyer will be dissatisfied.

We wish, however, to make a distinction between goals and expectations. An organization with a goal has actively been involved in the setting of the aims for the exchanges. The organization has set the objectives after a decision process based on bounded rationality. While goals are on the organizational level usually expressed by groups of individuals [19], expectations can be said to exist on an individual level. Many persons are thus involved in a relationship and everyone does not have to have been actively involved in the setting of the aims. In some cases the relationship can start with interactions on the top level, and later spread to the functional level. A person at the functional level, does not have to have explicit goals for interacting although he will most certainly have expectations. A conclusion from this reasoning is that goals and outcomes will be based on active explicit behavior concerning the objectives of the relationship based on economic and financial plans. Expectations are more individual assumptions concerning the exchanges.

The Goals of the Firms

The goals are mainly economic and technical but also other aspects of the exchanges as the social dimension can be regarded as equally important. The economic goal stipulated by the firm does not necessarily have to be in congruence with neoclassic profit maximization. Instead an actor can try to attain outcomes in line with other kinds of goals and strive for relationships based on mutuality and trust. A prerequisite for lasting relationships is the absence of opportunistic behavior.

The buyer-supplier relationship will include three dimensions concerning the service quality. Parallel to quality goals regarding the technical solution and functional quality there are economic goals. The quality is equivalent to the extent that the outcomes correspond to goals, expectations on each three dimension. A clear correspondence thus emerges between the quality

dimensions and the bonds in the relationship. The *technical solution* in the exchange corresponds to technical, knowledge and partly legal bonds, i.e., contracts stipulating technical specifications. The *functional quality* on the other hand corresponds to knowledge, planning and social bonds. The *economic quality* consists of economic and partly legal bonds between the firms.

The Economic Quality Dimension

All business has to be profitable, efficient, effective and productive; in the long run an actor will not survive unless he is profitable. Productivity indicates how efficiently the resources are utilized and can be divided into internal and external efficiency. Improving productivity does not necessarily imply declining quality, on the contrary, quality improvements often lead to improved productivity. This is possible as waste and the repetition of tasks are reduced and as the knowledge of the needs and wants of the buyers increases.

The economic quality dimension implies for the buyer that the relationship has to be profitable. Without profitability a termination of the relationship is very likely. Profitability means that the buyer can receive compensation at the next step in the activity chain for costs in the exchanges with the supplier. To the supplier the economic quality dimension means that the received price covers total costs, including both internal and external quality failure costs. Total costs that arise in a relationship can be considerably higher than the direct costs, which usually are easier to measure. Total costs also consist of indirect costs, psychological costs and quality failure costs [8].

Quality failure costs can be divided into four groups [20]. *Internal quality failure costs* arise before the transfer to the buyer, when products have to be thrown away and therefore not salable and alterations, inspections, storage etc. *External quality failure costs* like repairs, guaranties and

complaints are costs arising when taking care of delivered, to the buyer transferred products, which do not meet with the quality standards. *Inspection costs* arise in connection with the evaluation whether the products and processes meet with the specifications. The last type of quality failure costs is *preventive costs of introducing, implementing and securing a quality system*. Correspondingly, the net price of the supplier for a product can be far below estimated profit because of unobserved extra expenses, costs. Some of the economic aspects of quality, like storage and inspections, are fairly easy to estimate and measure and others, like possible preventive adjustments, considerably more difficult to estimate.

The Functional Quality Dimension

Parallel to economic goals there are other quality goals. The technical solution can be observed and measured with specific technical requirements, like for example durability, precision and ISO standards, and made explicit in contracts. The functional part of the product and its transfer is less tangible and can not easily be measured or estimated, at least not in quantitative terms. Functional issues are, however, equally important, if not even more important than technical ones. The functional quality dimension can be divided in two aspects, and consists of (i) how the individuals perceive the interactions and (ii) how the transfer of the product is carried out. Functional quality thus consists of aspects on personal chemistry and the communication between the involved, if there is trust and commitment in the relationship as well as how the deliveries are adjusted.

According to our studied buyers it is of utmost importance for the establishing firm to develop a so called *capital of trust*. The capital of trust can if properly managed provide both financial returns and other kinds of returns for everyone involved. The establishing firm has to create and strengthen its trust with buyers, so that the buyers can trust him. It is not possible to any greater

extent to urge on this process, it is a question of cumulatively developing trust on the personal level, normally a process lasting many years.

Honesty, mutuality, discretion, openness, ambition, realism, empathy, humbleness, seriousness, professional skill and pride and communication skills not necessarily in this order were some of the crucial factors mentioned in the choice of supplier. It is important to have the courage to inform the buyer of unpleasant things like not being able to deliver on time and explain why. The buyer appreciates an honesty like that from the suppliers because it proves the right kind of attitude. It further enables the avoidance of many problems, costs and delays, which tend to arise in connection with delays otherwise. It is often possible to somehow solve the problems through discussions and thereby no one has to lose time, money, materials, or even a buyer/supplier. In some cases the buyers actually terminate the supplier relationship if a delay occurs as delivery times are without exception to be kept. Other sanctions like a penalty fee can also sometimes result from delays.

A great deal of the success of a firm not only depends on resources under its direct control but largely on resources obtained through long-term relationships with suppliers. As one of the buyers expressed it "We shall become the best buyer in the world, there after the best supplier in the world." In other words, the firms have to be aware of their own strengths and weaknesses and have to have the will to improve and develop their business both towards the buyers and the suppliers.

The Technical Quality Dimension

As our study deals with establishing relationships from a technical service firm's point of view the fulfillment of technical specifications is very important, when the buyers evaluate the service

quality. Unless the supplier can deliver a product that technically fulfills the requirements future business is impossible and he can not stay in business in the long run. Technical standards are generally the first and the decisive criteria set by buyers for the suppliers to fulfill. An even quality level which is reproducible on a large scale with only minor deviations, that is a high repetition accuracy, is the aim for both the supplier and the buyers. The costs for developing this even technical quality are crucial. If short-term thinking prevails in the buying firm such high initial costs will deter the firm from developing such a technical service quality. Long-term thinking buyers are prerequisites for long-term thinking suppliers, since otherwise technical and financial plans do not motivate the choice and keeping of the supplier. Usually contracts stipulating projects are made which result in so called project plans. In this way the firms safeguard themselves and are able to terminate the relationship if for example costs should increase unacceptably. Simultaneously the contracts facilitate the evaluation of realized projects.

The studied supplier says that quality implies fulfilling calculations and profit margins and simultaneously offering *value* for the buyer. This corresponds to both an internal and an external dimension regarding quality. For the supplier the follow-up of deliveries is a major problem. The documentation of made tests is done carefully and is by the buyers rated as one of the suppliers greatest competitive advantages.

CONCLUSIONS

It is obvious that economic considerations permeate the exchanges and the quality evaluation, at least in the long run. The buyers can experiment with new promising suppliers, but only to a certain extent, over a reasonable period of time - sooner or later the relationship enters a make-money-phase. A termination of the relationship with the supplier does not always have to mean that the buyer finds the relationship a waste of time and money. On the contrary, the relationship

can be seen as a stage in the development of a know-how-bank or slack [18] that every firm has regarding the line of business, technology and products. The buyer can in a later stage resume the supplier if premises change and for example the technology of the supplier improves.

Service quality is by the buyers perceived as the fulfillment of technical specifications and around this there is the personal chemistry parallel to economic issues. Working social relations are a must, one cannot compensate this dimension with technology. Service quality must be considered from a holistic perspective consisting of technology, administration, security in deliveries and an working information flow, etc. Security in deliveries is important because of high costs in case of a break down in the production process. Costs of storage and a feeling of insecurity are some obvious consequences in case of delays and other problems in the deliveries. A failing information flow can lead to a change of supplier since the situation will become intolerable if the supplier doesn't give the right information, gives false information or other wise takes advantage of his position repeatedly.

Service quality is both competence and service as patents alone do not guarantee success for a very long time - an appropriate balance between technology and market orientation is optimal. Irrespective of line of business the service firms who want to stay on top have to be market oriented and complement hardware with buyer adjusted software, that is concentrate on high quality in other aspects than technical only. The result has to be high-qual-high-tech. Not even where technology seems to dominate can it by itself determine service quality perceived by buyers, it is the perception of all the interactions that counts and in this technology is only one part.

In our model describing service quality and relationships in industrial service organizations this is illustrated by dividing buyer perceived service quality into a technical, a functional, and a economic quality dimension. Good service quality is formed when the supplier knows the

buyers' needs and develops and adjusts the problem solution so that it meets these needs. The importance of long-term relationships causes the suppliers and buyers to try to attain cooperation and to share the responsibility over the growth of processes and products.

(INSERT FIGURE 3 HERE)

In our study buyer perceived service quality has been derived from three different quality dimensions, namely economic, functional and technical quality. The economic quality dimension consists of different costs ranging from initial costs when establishing a new relationship, production costs when using the product in the production process, failure costs and inspection costs when the technical specifications are not met, storage costs for handling the products, to finally costs for guarantees and complaints. All these costs together form the buyer's profitability for a specific product and a specific relationship. This study has shown that buyers embedded in an industrial network must be able to sell their product to their buyers at a profit - this could be called a profit chain.

Functional quality explains how the individuals involved in the relationship perceive each other and how the product is transferred from the seller to the buyer. Mutuality, trust, communication, social relationships and the actors' characteristics in terms of openness, empathy, professional skills, etc., are important criteria for buyers when they evaluate a seller and his performance. In other words, the buyer must have confidence in the seller. The second aspect with functional quality is the transfer of the product and here the buyers seem to emphasize secure deliveries and accessibility.

The technical quality is evaluated by analyzing if the products are produced in accordance with the technical specifications, how they are adapted to the buyer's needs and the documentation of the production. Furthermore, the seller's machinery, production facilities, cars, computer systems

and administrative routines will influence on how the buyer perceives the technical quality. Efficient production, implemented quality standards, clean facilities, buyer adapted computer systems and administrative routines will increase the buyer's feelings of being important to the seller.

We have certified that different exchanges take place in the interactions between the firms; there are exchanges of information, social contacts and business. Through interacting the firms invest in relationships, which become long-term. These evolving long-term bonds influence the service quality perceived by the firms and must consequently be considered when studying the buyer evaluation of service quality. The bonds make up the context for the quality evaluation influencing the buyer and his evaluation and to study only separate exchanges without including this context would result in a rather limited description.

The firms have goals for their relationships with the supplier expressed in technical, functional, and financial analyses, which are used when evaluating the service quality. In order to achieve a better problem solution there are goals concerning the technical requirements. Moreover, there are functional aspects of the service quality in the relationship based on honesty, trust and mutuality. The economic aspect is illustrated by one of the respondents when he used the phrase make-money-phase as a base for a working relationship - concerns like productivity, efficiency and effectively have always to be taken into consideration and they form a base for all kind of cooperation and business.

The goals in the service quality dimensions and the outcomes are in the model to be seen as an evaluation of the interactions and bonds taking place in an atmosphere consisting of mutuality, trust and norms. The service quality perceptions of the firms surround their relationship and these perceptions control and direct the relationship. The quality perceptions emanate from the goals with the relationship and the outcomes of the exchanges. It is obviously difficult to

generalize buyer perceived service quality as it is embedded in a specific context. The concept of service quality is dynamic and alters as the firms get to know each other and as bonds evolve. In this article we have stressed the economic quality dimension since earlier studies have not to any larger extent elaborated this issue.

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FIGURE 1
A Focal Actor's Strategic Alternatives when Establishing Relationships

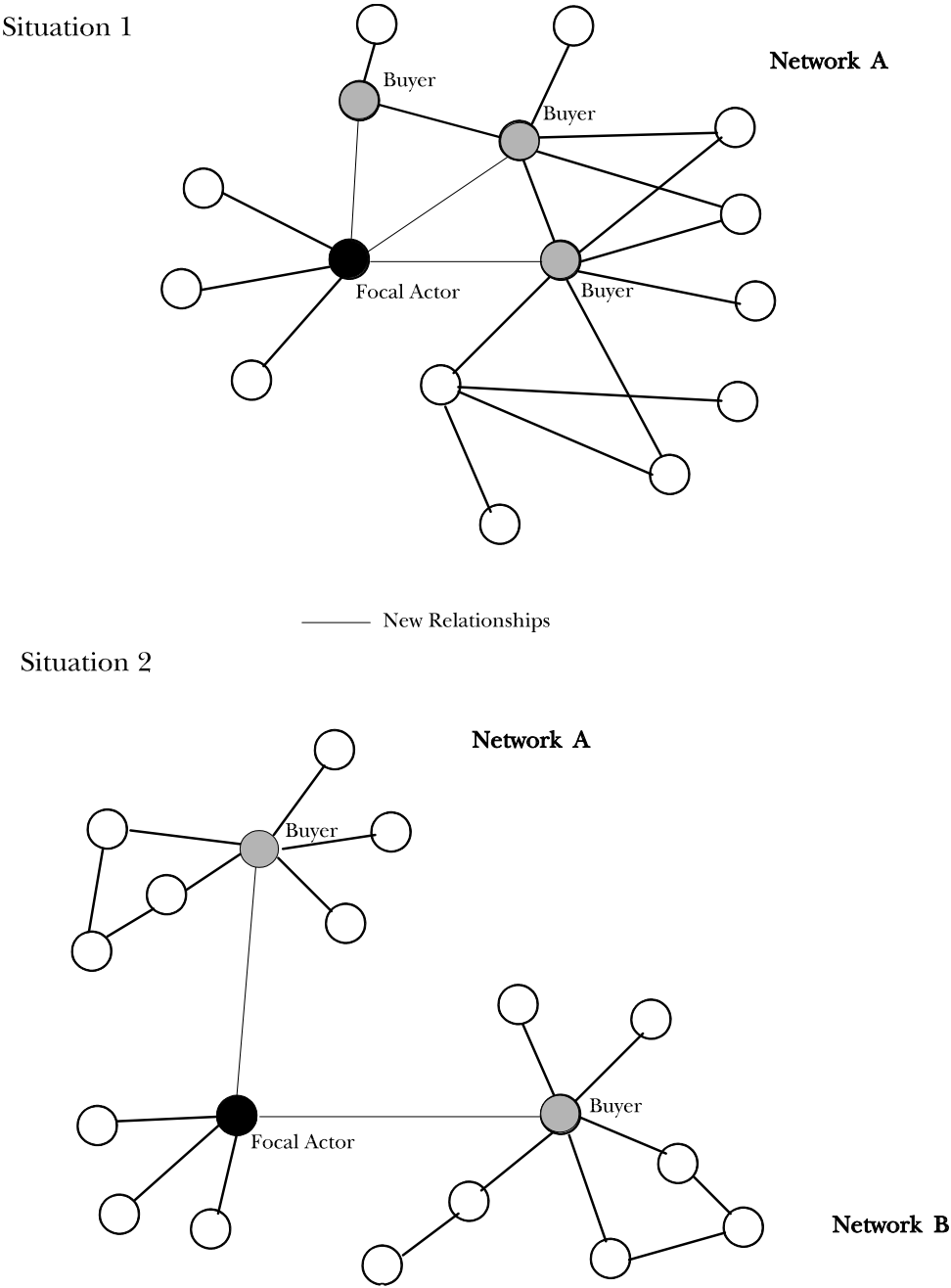


FIGURE 2

Quality and Relationships in Industrial Service Organizations

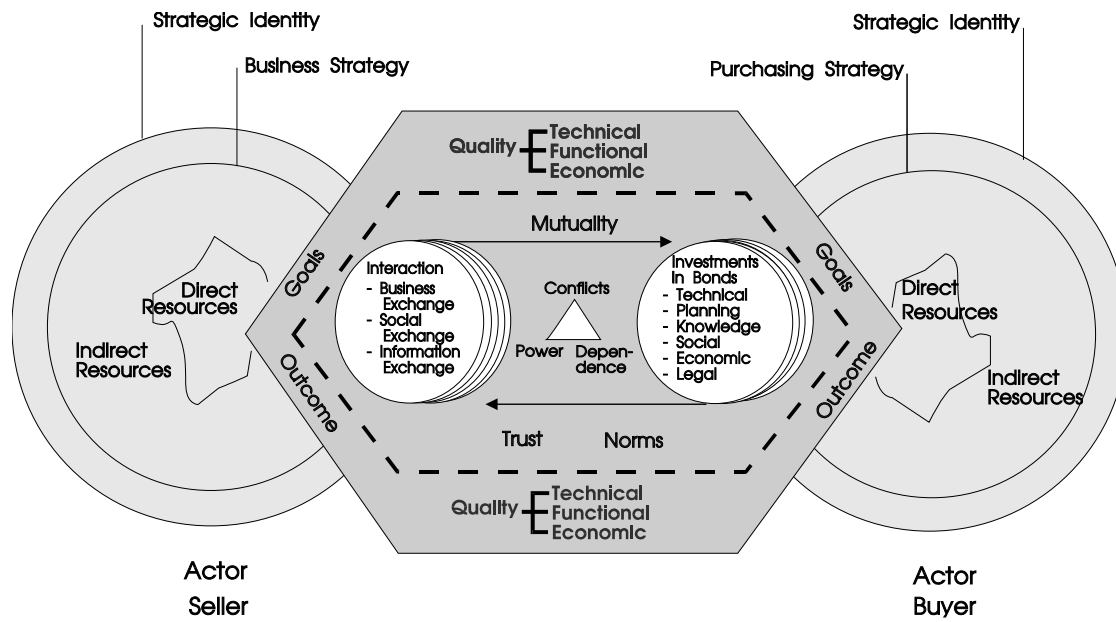


FIGURE 3

Management Checklist for Industrial Service Quality

Economic Quality	Functional Quality	Technical Quality
Profitability	Mutuality	Technical Specifications
Productivity	Trust	R&D
Initial Costs	Social Relationships	Testing
Production Costs	Communication	Production
Failure Costs	Actors' Characteristics	Adaptations
Inspection Costs	Secure Deliveries	Documentation
Storage Costs	Adjusted Deliveries	Equipment
Guarantee Costs	Accessibility	Computer Systems
Complaint Costs		Administrative Routines

Biographical sketches on each author:

Address correspondence to:

Researcher **Maria Holmlund** M. Sc. (Econ. and Bus. Adm.), Department of Marketing, Swedish School of Economics and Business Administration, P.O.Box 479, FIN-00101 HELSINGFORS, Finland. Phone + 358 0 403 03396, Fax + 358 0 403 03287. E-mail Maria.Holmlund@.Shh.Fi.

Associate Professor **Sören Kock** (Ph.D.), Department of Marketing, Swedish School of Economics and Business Administration, P.O.Box 287, FIN-65101 VASA, Finland. Phone + 358 61 3247 522, Fax + 358 61 3129 579. E-mail Soren.Kock@Wasa.Shh.Fi.

Teaser in the Table of Content

Technical, functional, and economic dimensions of service quality.

Breakouts in the text

- p. 6* **The firm has developed an innovative laser technology solution**
- p. 9* **50% of the entrepreneur's time is spent on developing personal contacts**
- p. 11* **Considerable quality costs due to delivery problems and corrections**
- p. 16* **Better productivity does not necessarily imply worsened quality**
- p. 17* **Functional issues like trust are not easily measured**
- p. 19* **The fulfilling of technical specifications is the first and decisive criterion**